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Description

The invention relates to a video rear-screen projection apparatus having a folded and an unfolded condition comprising a housing accommodating a fixedly arranged cathode-ray tube which is provided with a projection lens, a first mirror, a transparent screen extending in the direction of the width of the housing and parallel to the front side of the housing and a second mirror being supported in such a manner that the screen and the two mirrors are extended so that the rays from the cathode-ray tube in the unfolded condition strike the transparent screen while in the folded condition the screen and the two mirrors are located all inside the housing.

Video rear screen projection apparatus of the type described above are shown in US—A—4.385.313 and FR—A—1.134.279. The various components of these known apparatuses are in part accommodated movably in a housing in such a manner that, when the apparatus is out of use, all the components are located inside the housing, while when the apparatus is in use one or more of the components are moved outwards in order to obtain a system which optically operates correctly.

The invention has for its object to provide a video rear-screen projection apparatus of the above kind comprising a movement mechanism for the various components which is of simple construction and which in the folded condition yields an apparatus of very small dimensions.

In order to achieve this object, the apparatus according to the invention is characterized in that the cathode-ray tube is secured to a frame which, adjacent two opposite side walls of the housing, has two members in which a shaft coupled to a motor is journaled at its ends, which shaft carries a plate at each of its ends, the first mirror being connected at two opposite sides *via* hinges arranged approximately in alignment with its wide side to said side walls of the housing and being pivotally linked by a bar on each of said two sides to an associated one of said plates so that in one position of these plates the mirror is located entirely inside the housing and in another position it is extended with its reflecting surface facing the projection lens, the transparent screen is provided at each of two opposite sides with a pair of pivots which are located a certain distance above one another and which are connected by first and second bars which cross one another to a pivot on the frame, and a pivot on an associated one of said plates, respectively, each of the first bars being provided between its ends with a pivot which is connected *via* a third bar to the associated one of said plates, and the second mirror being supported between the second bars in such a manner that upon rotation of said plates the screen and the two mirrors are extended so that the rays from the cathode-ray tube strike the transparent screen.

The invention will be described more fully with reference to the drawing, which shows in sec-

tional view an embodiment of a video projection apparatus in two conditions.

Figure 1 is a side elevation of the apparatus in the extended condition, while Figure 2 is a similar view of the apparatus in the folded condition.

In the drawing, reference numeral 1 denotes a housing having a bottom 2, a rear wall 3, an upper wall 4 and two side walls. In the housing 1, a cathode-ray tube unit 5 is connected by means not shown to a frame 14. The tube unit is provided with a lens 6 which projects the rays onto a first mirror 7. This mirror 7 extends over a part of the width of the housing 1, the width of the housing extending in a direction perpendicular to the plane of the drawing. The mirror 7 is provided at two opposite sides with side plates 8 and with pivots 9 by means of which the mirror 7 is pivotally connected to the bottom 2 of the housing 1. The side plates 8 are each pivotally linked by a bar 10 to one of two plates 11. The plates 11 are fixedly secured on the ends of a shaft 12 which is journaled in lugs 13, which are secured to the frame 14 adjacent the side walls of the housing. The shaft 12 is coupled to a controllable electric motor not shown.

The apparatus is further provided with a transparent screen 15 which extends throughout the width of the housing and substantially parallel to the front side of the housing. The transparent screen 15 is provided at two opposite sides with side plates 16. Each of these side plates 16 carries two pivots 17 and 18 which are connected *via* bars 19 and 20 which cross one another to pivots 21 and 22, respectively, on the frame 14 and an associated one of the plates 11, respectively. Each bar 19 is further provided between its ends with a pivot 23 which is connected by a bar 24 to a pivot 25 on the associated plate 11. A second mirror 30 is supported between the two bars 20. The path of the light rays 26, 27, 28 from the cathode-ray tube is indicated in Fig. 1 by dotted lines.

By actuation of the electric motor (not shown) the shaft 12 can be rotated through a given angle, whereby in position 1 the situation shown in Figure 2 is reached. In this position, the mirrors and the transparent screen are folded so that they are located entirely within the confines of the housing 1.

In the other position, the situation shown in Figure 1 is obtained. In this case, the mirror 7, like the transparent screen 15 and the second mirror, is extended. The transparent screen has not only moved forwards but has also moved slightly upwards, which has the advantage that a better eye level for the spectator is obtained.

In a practical embodiment, the dimension of the apparatus from front to back was 67 cm in the extended condition and only 42 cm in the folded condition. This ensures that the apparatus, when it is out of use, occupies only a very small space so that it can be used very suitably also in smaller rooms.

Claim

A video, rear-screen projection apparatus having a folded and an unfolded condition comprising a housing (1) accommodating a fixedly arranged cathode-ray tube unit (5) which is provided with a projection lens (6), a first mirror (7), a transparent screen (15) extending in the direction of the width of the housing (1) and parallel to the front side of the housing and a second mirror (30) being supported in such a manner that the screen (15) and the two mirrors (7, 30) are extended so that the rays from the cathode-ray tube in the unfolded condition strike the transparent screen (15) while in the folded condition the screen and the two mirrors are all located inside the housing, characterized in that, the cathode-ray tube unit (5) is secured to a frame (14) which, adjacent two opposite side walls of the housing (1), has two members (13) in which a shaft (12) coupled to a motor is journaled at its ends, which shaft (12) carries a plate (11) at each of its ends, the first mirror (7) is connected at two opposite sides *via* pivots arranged approximately in alignment with the wide side to said side walls of the housing (1), and is pivotally linked by a bar (10) at each of said two sides to an associated one of said plates (11) so that in one position of these plates (11), the mirror (7) is located entirely inside the housing (1) and in another position it is extended with its reflecting surface facing the projection lens (6), the transparent screen (15) is provided at each of two opposite sides with a pair of pivots (17, 18) which are located at a certain distance above one another and which are connected by first and second bars (19, 20) which cross one another to a pivot (21) on the frame (14) and a pivot (22) on an associated one of said plates (11), respectively, each of the first bars (19) being provided between its ends with a pivot (23) which is connected *via* a third bar (24) to the associated one of said plates (11) and the second mirror being supported between the second bars (20) in such a manner that upon rotation of said plates (11) the screen (15) and the two mirrors (7, 30) are extended so that the rays from the cathode-ray tube strike the transparent screen.

Patentanspruch

Video-Rückprojektionsgerät mit einem zusammengeklappten und einem aufgeklappten Zustand, mit einem Gehäuse (1) mit einer darin ortsfest angeordneten Elektronenstrahlröhreneinheit (5), die mit einer Projektionslinse (6), einem ersten Spiegel (7), einem transparenten Schirm (15), der sich in der Breitenrichtung des Gehäuses (1) und parallel zu der Vorderseite des Gehäuses erstreckt, sowie mit einem zweiten Spiegel (30), der derart unterstützt wird, daß der Schirm (15) und die zwei Spiegel (7, 30) derart ausgeklappt werden, daß die Strahlen von der Elektronenstrahlröhre in dem aufgeklappten Zustand den transparenten Schirm (15) treffen, während in dem zusammengeklappten Zustand der Schirm

und die zwei Spiegel alle innerhalb des Gehäuses liegen, dadurch gekennzeichnet, daß die Elektronenstrahlröhreneinheit (5) an einem Rahmen (14) befestigt ist, der an den zwei einander gegenüberliegenden Seitenwänden des Gehäuses (1) zwei Elemente (13) aufweist, in denen eine mit einem Motor gekuppelte Welle (12) an ihren Enden drehbar ist, wobei diese Welle (12) an jedem ihrer Enden eine Platte (11) aufweist, wobei der erste Spiegel (7) an zwei einander gegenüberliegenden Seiten mittels etwa in der Verlängerung der breiten Seite liegender Gelenke mit den genannten Seitenwänden des Gehäuses (1) verbunden ist und an jeder der zwei Seiten durch eine Stange (10) mit einer der genannten Seitenplatten (11) drehbar verbunden ist, so daß in der einen Lage dieser Platten (11) der Spiegel (7) völlig innerhalb des Gehäuses (1) liegt und in der anderen Lage ausgeklappt ist, wobei die reflektierende Fläche der Projektionslinse (6) zugewandt ist, wobei der transparente Schirm (15) an jeder der zwei einander gegenüberliegenden Seiten mit einem Gelenkepaar (17, 18) versehen ist, die um einen bestimmten Abstand übereinander liegen und die durch erste und zweite Stangen (19, 20) verbunden sind, die sich an einem Gelenkpunkt (21) auf dem Rahmen (14) bzw. an einem Gelenkpunkt (22) auf einer zugeordneten Platte (11) schneiden, wobei jede der ersten Stangen (19) zwischen ihren Enden mit einem Gelenk (23) versehen ist, das über eine dritte Stange mit einer zugeordneten Platte (11) verbunden ist und wobei der zweite Spiegel zwischen den zweiten Stangen (20) derart befestigt ist, daß nach Drehung der genannten Platten (11) der Schirm (15) und die zwei Spiegel (7, 30) derart ausgeklappt werden, daß die Strahlen der Elektronenstrahlröhre den transparenten Schirm treffen.

Revendication

Appareil de projection vidéo par transparence présentant un état déployé et un état replié, comportant un boîtier (1) dans lequel est disposée de façon fixe une unité de tube à rayons cathodiques (5), qui est munie d'une lentille de projection (6), d'un premier miroir (7), d'un écran transparent (15) s'étendant dans la direction de la largeur du boîtier (1) parallèlement à la face avant du boîtier et un deuxième miroir (30) qui est supporté de façon que l'écran (15), les deux miroirs (7, 30) se trouvent à l'état déployé, disposés de façon que les rayons provenant du tube à rayons cathodiques déployé parviennent sur l'écran transparent (15) alors qu'à l'état replié, l'écran et les deux miroirs se situent tous dans le boîtier, caractérisé en ce que l'unité de tube à rayons cathodiques (5) est fixée à un châssis (14) muni de deux organes (13) disposés au voisinage de deux parois latérales, opposées du boîtier (1), organes dans lesquels reposent les deux extrémités d'un arbre (12) accouplé à un moteur et supportant une plaque (11) à chacune de ses extrémités, le premier miroir (7) étant relié, à deux faces situées vis-à-vis

l'une de l'autre, par l'intermédiaire de charnières disposées de façon que sa face large soit pratiquement alignée par rapport auxdites parois latérales du boîtier et étant relié d'une façon à pouvoir pivoter par une tige (10) à chacune desdites deux faces à une plaque correspondante desdites plaques (11), de sorte que dans une position de ces plaques (11), le miroir (7) se situe entièrement dans le boîtier (1) et que dans une autre position il déploie sa surface réfléchrice vis-à-vis de la lentille de projection (6), l'écran transparent (15) est muni, à chacun des deux faces opposées d'une paire de points d'articulation (17, 18) qui sont situés à une certaine distance au-dessus l'un de l'autre et qui sont reliés par des

premières et secondes tiges (19, 20) se croisant en un point d'articulation (21) sur le châssis (14), et en un point d'articulation, (22) sur une plaque correspondante desdites plaques (11) respectivement, chacune des premières tiges (19) étant munie, entre ses extrémités, d'un point d'articulation (23) qui est relié par l'intermédiaire d'une troisième tige (24) à la plaque correspondante desdites plaques (11), et le deuxième réflecteur étant supporté entre les secondes tiges (20) de façon que lors de la rotation desdites plaques (11), l'écran (15) et les deux miroirs (7, 30) se déploient de façon que les rayons provenant du tube à rayons cathodiques parviennent sur l'écran transparent.

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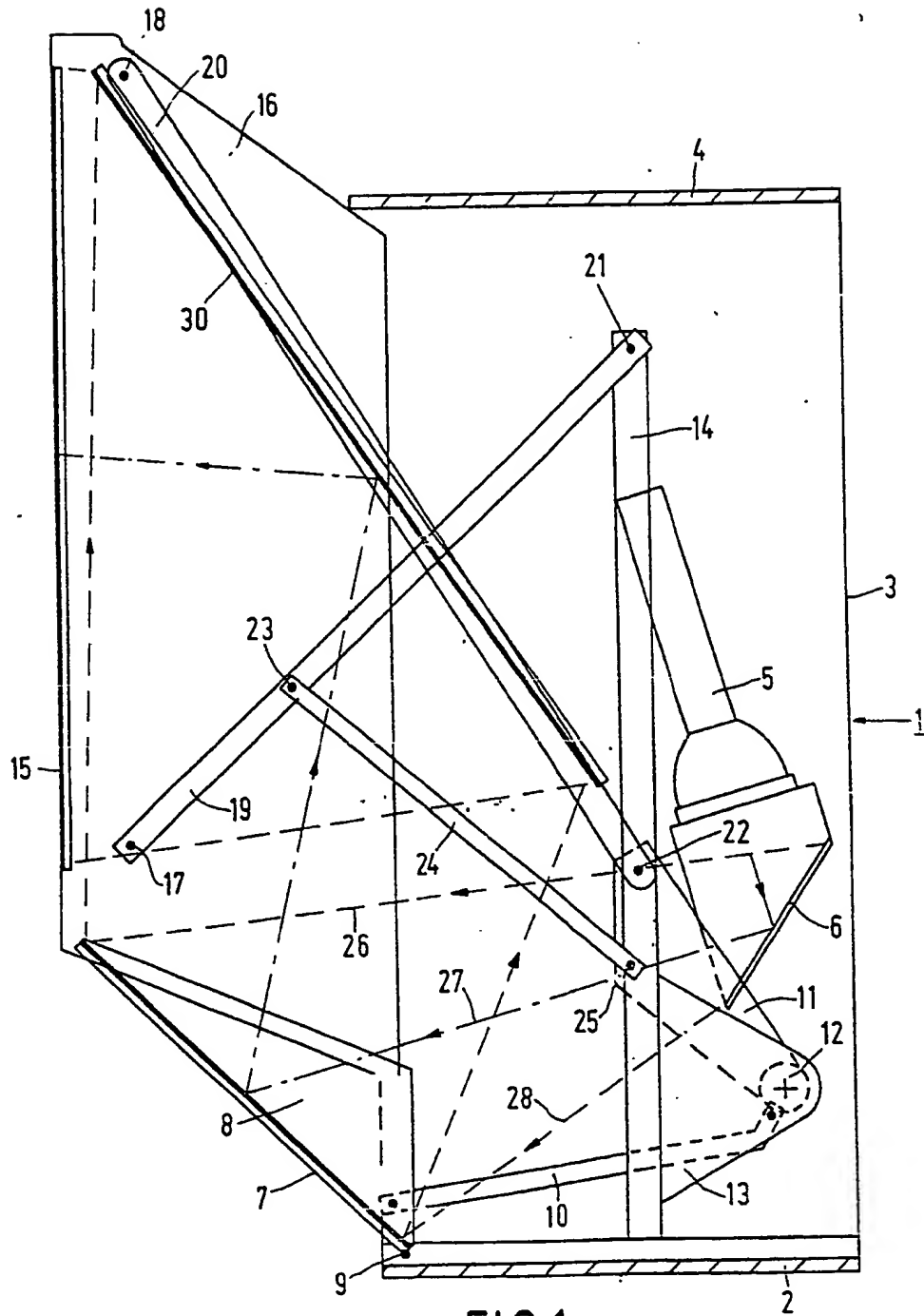


FIG.1

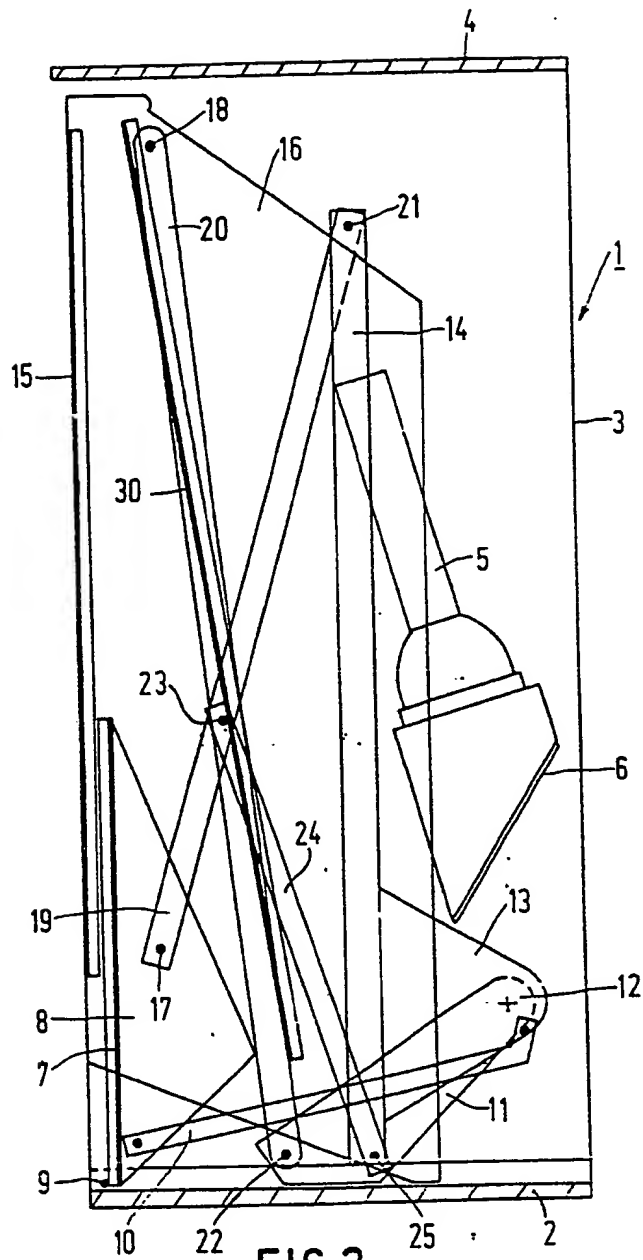


FIG. 2